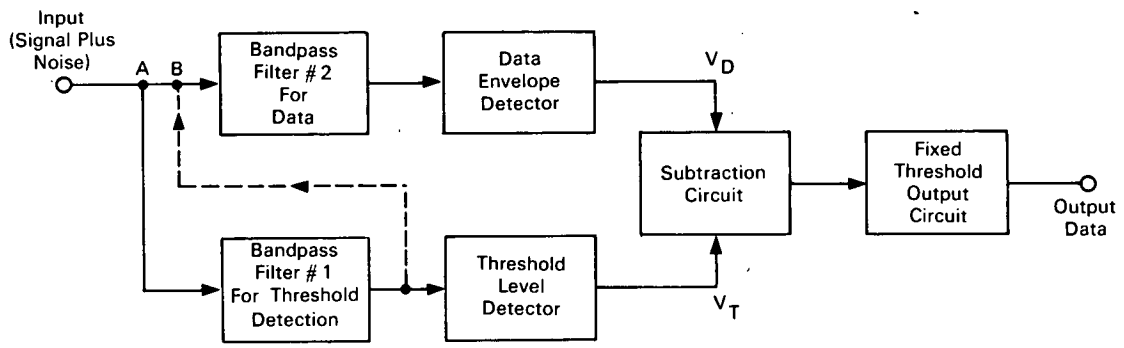
NASA TECH BRIEF

Circuit Maintains Digital Decision Threshold at Preset Level



The problem: To maintain the optimum decision threshold in digital information link equipment regardless of input-signal and noise-level amplitude variations. Commonly used automatic-gain-control (AGC) circuits are nonlinear in operation, too slow in response for digital system application, and make a receiver quite complex.

The solution: An optimum decision-level circuit that will maintain the decision threshold at any preselected percentage of the input-signal amplitude.

How it's done: The optimum decision-level circuit consists of a pair of bandpass filters, one detector each for the data envelope and the threshold level, a subtraction circuit, and a fixed-threshold output circuit.

The threshold-level detector detects the peak signal-plus-noise passed by bandpass filter #1. This detector has a fast attack time to provide a threshold voltage to the subtraction circuit before information from the data envelope detector arrives. The voltage decay time of the threshold-level detector is slow relative to the information pulse rate, but fast enough to follow any normal input signal-level variation. The threshold-level detector is variable to provide any desired threshold voltage relative to the amplitude of the data-envelope detector output.

Bandpass filter #2 separates the signal from the noise and feeds it to the data-envelope detector, which recovers the modulation from the carrier and feeds it to the subtraction circuit. The subtraction circuit compares the envelope detector output V_D, with the peak voltage V_T of the threshold-level detector. When V_D is greater than V_T, the fixed-threshold output circuit produces an output data pulse.

Notes:

1. This invention would be useful with communications equipment involving recognition of transmitted digital information.

2. The alternate connection indicated by the dashed line may be desirable when the bandwidth of filter #1 is equal to or greater than that of filter #2. In this case, the line from A to B is omitted.

(continued overleaf)

3. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama. 35812
Reference: B65-10281

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